3 PART II NAS ARCHITECTURE SUPPORTING ELEMENTS OVERVIEW

Part II and Part III describe the concept of how a modernized NAS would operate based on the principles published in the *Government/Industry Concept of Operations* and *A Concept of Operations for the National Airspace System in 2005* (referred to jointly as the CONOPS). A brief discussion of each section in Part II follows.

Based on the CONOPS, operations within the NAS will change as the NAS is modernized. Section 4, NAS Operations, summarizes the NAS architecture from the user/pilot perspective, with a generalized description of flight operations and potential user benefits in a modernized NAS.

To ensure safety, new capabilities will be implemented incrementally. Section 5, Evolution of NAS Capabilities, defines the three NAS modernization phases and summarizes the enhanced and new capabilities available to air traffic service providers and users. Appendix D provides detailed capability drawings and a matrix for each NAS modernization time period, by phase of flight.

The FAA recognizes that modernization has a variety of technology and acquisition risks. Section 6, Free Flight Phase 1, Safe Flight 21, and Capstone, describes the programs that comprise the NAS modernization risk-mitigation effort. The programs evaluate new technologies and procedures in an operational environment to reduce implementation risks and identify user benefits. The results will serve as a basis for user/provider decisions on national deployment.

During NAS modernization, the FAA's highest priority is to ensure that the safety of the air traffic control system is improved. Section 7, Safety, describes how safety will be improved through incremental implementation of new systems, controller automation tools, and new cockpit avionics.

Because NAS operations are so complex, it is important, from a safety and workload perspective, to understand the human factors implications of changes to the NAS. Section 8, Human Factors, outlines the approach that will be used to: (1) develop or improve human interfaces with the system; (2) optimize human/product performance during system operation, maintenance, and support; and (3) make economic decisions on personnel resources, skills, training, and costs.

The FAA must maintain a system that includes both physical and information security. Section 9, Information Security, outlines the security issues and approaches required to protect new information-based systems while increasing data exchange with external users. This section also addresses the increasing dependence on commercial, "open" systems and the urgency of protecting NAS data availability, integrity, confidentiality, and authenticity. Physical security is an enabler of information security; Section 29, Facilities and Associated Systems, provides more information on physical security.

It is important for the FAA and the users to mutually understand the impact of emerging technologies before they are implemented. Section 10, Research, Engineering, and Development (R,E&D), describes the R,E&D program and its relationship to the NAS modernization process.

Standards and certification of new avionics, procedures, or systems is fundamental to maintaining the safety and interoperability of the NAS. Section 11, Regulation and Certification Activities Affected by New NAS Architecture Capabilities, discusses some of the FAA's processes used to carry out the regulatory and certification mission. This section contains a preliminary analysis of the regulations that will need to be revised and/or expanded to accommodate NAS modernization.

As in most major service organizations, personnel are the FAA's primary and most costly asset. Section 12, Personnel, discusses the costs and overall staffing levels by budget categories.

The overall resource requirements of a plan must be understood before it is implemented. Section 13, Cost Overview, discusses the costs associated with modernization for three types of funding: R,E&D; facilities and equipment (F&E); and operations (OPS). The costs associated with the Airport Improvement Program (AIP) are not addressed in the architecture at this time.